

Chapter 1 Linear Equations

1. Find the slope of the line through the given points and then write the equation of the line.

$(4, 1)$ and $(2, -3)$ slope = $\frac{-3-1}{2-4} = \frac{-4}{-2} = 2$ $y = mx + b$
 $y = 2x + b$
 $1 = 2(4) + b$
 $1 = 8 + b$

$y = 2x - 7$

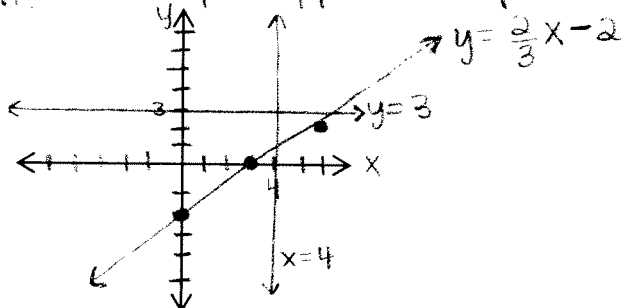
2. Write an equation that is parallel to and one that is perpendicular to $y = 3x + 2$. $b = -7$

Parallel $y = 3x + 7$
 Same slope any y-int

Perpendicular $y = -\frac{1}{3}x - 5$ any y-int
 Slope = opposite reciprocal

3. Graph the following equations.

$\frac{3y}{3} = \frac{2x-6}{3}$ $y = \frac{2}{3}x - 2$
 $y = 3$
 $x = 4$
 slope y-int



4. Find the x and y intercepts. $2x - 3y = 12$

x-int: $y = 0$ $(6, 0)$
 $2x - 3(0) = 12$
 $2x = 12$
 $x = 6$

y-int: $x = 0$ $(0, -4)$
 $2(0) - 3y = 12$
 $-3y = 12$
 $y = -4$

5. If y varies directly as x, write the equation if $y = 24$ when $x = 8$.

$y = kx$ $24 = k \cdot 8$ $k = 3$
 $y = 3x$

6. If y varies inversely as x, write the equation if $y = 4$ when $x = 5$.

$y = \frac{k}{x}$ $5 \cdot 4 = \frac{k}{5}$ $k = 20$
 $y = \frac{20}{x}$

7. Solve the following absolute value problems.

$|x+2| = 5$
 $x+2 = 5$ or $x+2 = -5$
 $x = 3$ or $x = -7$

$|x+2| < 5$ $-5 < x+2 < 5$
 $-7 < x < 3$

$|x+2| > 5$ $x+2 > 5$ or $x+2 < -5$
 $x > 3$ or $x < -7$

Chapter 2 Functions

Use the given functions for the following problems.

$f(x) = x + 7$

$g(x) = 3x + 1$

1. $f + g$

$(x+7) + (3x+1)$
 $4x + 8$

2. $f(4) \cdot g(4)$

$4+7 = 11$

3. $f \circ g$ $g = x$
 $(3x+1)+7$
 $3x+8$

4. $f \cdot g$
 $(x+7)(3x+1)$
 $3x^2 + x + 21x + 7$
 $3x^2 + 22x + 7$

5. $g - f$

$(3x+1) - (x+7)$
 $3x - x + 1 - 7$
 $2x - 6$

6. $(f \circ g)(4) \cdot g(4)$
 $3(4)+1$
 $12+1$
 13

Simplify the following problems.

7. $4x^3(7x^5)$
 $28x^8$

8. $(x^3)^5$
 x^{15}

9. $(7x^7)^2$
 $49x^{14}$

10. $5^{-2} = \frac{1}{5^2}$
 $\frac{1}{25}$

11. $16^{\frac{1}{2}}$
 $\sqrt{16}$
 4

12. $\frac{24x^3y^8}{3x^5y^2}$
 $8x^{-2}y^6$
 $\frac{8y^6}{x^2}$

Chapter 3 Systems of Equations

Solve by graphing.

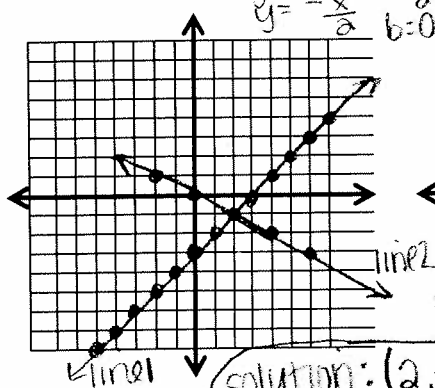
Graph the inequalities.

$$5y \leq 2x - 10$$

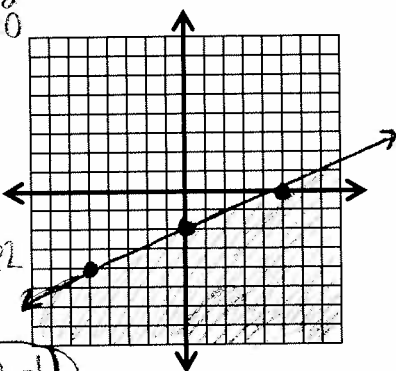
$$y \leq \frac{2}{5}x - 2$$

1. $y = x - 3$ $m = 1$ $b = -3$

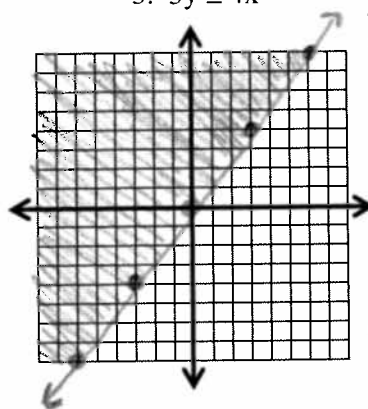
$x + 2y = 0$ $2y = -x$ $m = -\frac{1}{2}$ $b = 0$ $-2x + 5y \leq -10$



solution: $(2, -1)$



3. $3y \geq 4x$



$$y \geq \frac{4}{3}x$$

Solve the following systems of equations by substitution or elimination.

elimination

4. $(-2x - 6y = 0) \cdot 3$

$(3x + 11y = 4) \cdot 2$

$$-6x - 18y = 0$$

$$6x + 22y = 8$$

$$4y = 8$$

$$y = 2$$

$$(-6, 2)$$

substitution

5. $y = -2x + 9$

$3x - 4y = 8$

$$-2x - 6(2) = 0$$

$$-2x - 12 = 0$$

$$-2x = 12$$

$$x = -6$$

$$3x - 4(-2x + 9) = 8 - 14x + 36 = 8$$

$$3x + 8x - 36 = 8$$

$$11x - 36 = 8$$

$$11x = 44$$

$$x = 4$$

$$y = -2(4) + 9$$

$$y = -8 + 9$$

$$y = 1$$

$$(4, 1)$$

elimination

6. $(-7x + 5y = 0) \cdot 2$

$14x - 8y = 2$

$$2y = 2$$

$$y = 1$$

$$-7x + 5(1) = 0$$

$$-7x + 5 = 0$$

$$-7x = -5$$

$$x = \frac{5}{7}$$

$$\left(\frac{5}{7}, 1\right)$$

Chapter 5 Quadratic Functions

Give the vertex and the axis of symmetry.

1. $y = x^2 + 6x + 1$ $x = \frac{-b}{2a} = \frac{-6}{2(1)} = -3$

$$(-3)^2 + 6(-3) + 1 = -8$$

Solve by completing the square.

$$\text{vertex: } (-3, -8)$$

$$\text{axis: } x = -3$$

2. $y = (x - 5)^2 + 3$

$$\text{vertex: } (5, 3)$$

$$\text{axis: } x = 5$$

3. $x^2 + 10x + 25 = 7 + 25$

$$\frac{10}{2} = 5 \quad \sqrt{(x+5)^2} = \sqrt{32}$$

$$x + 5 = \pm \sqrt{32}$$

$$x = -5 \pm \sqrt{32}$$

$$\begin{array}{r} 3x+2 \\ \times 3x+2 \\ \hline -5-19-10 \end{array}$$

Solve.

4. $x^2 + 7x + 12 = 0$

$$(x+4)(x+3) = 0$$

$$x = -4 \quad x = -3$$

5. $3x^2 - 13x - 10 = 0$

$$(3x+2)(x-5) = 0$$

$$x = -\frac{2}{3} \quad x = 5$$

6. $x^2 - 49 = 0$

$$(x-7)(x+7) = 0$$

$$x = 7 \quad x = -7$$

7. $\sqrt{(x+3)^2} = \sqrt{64}$

$$x+3 = +8 \text{ or } -8$$

$$-3 \quad -3$$

$$x = 5 \text{ or } -11$$

8. $\sqrt{-36}$

$$6i$$

9. $\sqrt{-15}$

$$i\sqrt{15}$$

10. $8i^2 = 8(-1)$

$$-8$$

11. $(4i+2)(3i+5)$

$$12i^2 + 20i + 6i + 10$$

$$12(-1) + 26i + 10$$

$$-12 + 10 + 26i = -2 + 26i$$

Chapter 6 Logarithmic Functions

1. Change to log form. $4^2 = 16$

$$\log_4 16 = 2$$

$$2. \log_5 35 = \frac{\log 35}{\log 5} =$$

$$5^x = 35$$

Solve for x.

$$3. 4^x = 23$$

$$x = \log_4 23 = \frac{\log 23}{\log 4}$$

$$4. \log_x (32) = 5$$

$$x^5 = 32$$

$$x = 2$$

$$5. \log_7 x = 3$$

$$7^3 = x$$

$$x = 343$$

Chapter 7 Polynomials

Simplify

$$1. 4x^2(7x^3 - 5x^2 + x + 3)$$

$$28x^5 - 20x^4 + 4x^3 + 12x^2$$

$$2. (5x^3 + 8x^2 + 7x - 3) + (2x^2 + 7x - 8)$$

$$5x^3 + 10x^2 + 14x - 11$$

$$3. (5x - 3)^2 = (5x - 3)(5x - 3)$$

$$25x^2 - 15x - 15x + 9$$

$$25x^2 - 30x + 9$$

$$4. (7x + 2)(2x - 3)$$

$$14x^2 - 21x + 4x - 6$$

$$14x^2 - 17x - 6$$

Describe the end behavior of each function.

$$5. y = 8x^3 - 3x^4 + ax + c$$

odd/positive falls on left rises on right

$$6. y = -3x^4 + 5x^3 + ax^2 - bx + c$$

even/negative falls on both sides

7. Use synthetic division.

$$(x^4 - 10x^2 + 2x + 3) \div (x - 3)$$

$$x^3 + 3x^2 - x - 1$$

$$\begin{array}{r|rrrrrr} 3 & 1 & 0 & -10 & 2 & 3 \\ & & 3 & 9 & -3 & -3 \\ \hline & 1 & 3 & -1 & -1 & 0 \end{array}$$

Chapter 8 Rational and Radical Functions

Find the domain and all asymptotes.

$$1. f(x) = \frac{8x^2}{x+3}$$

$x+3=0$
 $x=-3$

domain: $x \neq -3$

asymptotes: VA: $x = -3$

HA: none

$$2. f(x) = \frac{9x^2}{x^2 - 3x - 28}$$

$$(x-7)(x+4)$$

$x \neq 7$ or -4

VA: $x = 7, x = -4$

HA: $y = 9$

Simplify (reduce, multiply, divide)

$$3. \frac{(x-6)(x+4)}{x^2 - 2x - 24}$$

$$\frac{(x-6)(x+4)}{(x-6)(x+6)}$$

$$\frac{x+4}{x+6}$$

$$4. \frac{6x^5}{5} \cdot \frac{x^8}{3} \cdot \frac{4}{x^3} = \frac{24x^{13}}{15x^3}$$

$$\frac{8x^{10}}{5}$$

$$5. \frac{x^2 + 11x + 24}{x^2 - 12x + 35} + \frac{5x + 40}{2x - 14}$$

$$\frac{(x+8)(x+3)}{(x-5)(x-7)} + \frac{2(x+7)}{5(x-7)} = \frac{2(x+3)}{5(x-5)}$$

Write each expression as a single rational expression in simplest form.

6. $\frac{3(7x+3)}{4} + \frac{(5x-1)2}{6}$

7. $\frac{x}{x-3} + \frac{3}{x+4}$

$$\frac{21x+9}{12} + \frac{10x-2}{12} = \frac{31x+7}{12}$$

$$\frac{x(x+4) + 3(x-3)}{(x-3)(x+4)} = \frac{x^2+4x+3x-9}{(x-3)(x+4)}$$

$$\frac{x^2+7x-9}{(x-3)(x+4)}$$

Solve each radical equation.

8. $\sqrt{x+2} = 7^2$
 $x+2 = 49$
 $x = 47$

9. $\sqrt{3x+4} - 2 = 8$
 $+2 +2$
 $\sqrt{3x+4} = 10^2$
 $3x+4 = 100$
 $-4 -4$
 $3x = 96$
 $\frac{3x}{3} = \frac{96}{3}$
 $x = 32$

10. $\sqrt[3]{x+7} = 4^3$
 $x+7 = 64$
 $-7 -7$
 $x = 57$

Chapter 9 Conics (2nd Period cut)

Identify and find the center/vertex of the following conics.

1. $x-2 = \frac{1}{4}(y-3)^2$

horizontal parabola
vertex: (2, 3)

2. $\frac{(y+1)^2}{4} - \frac{(x+2)^2}{9} = 1$

vertical hyperbola
center: (-2, -1)

3. $\frac{x^2}{25} + \frac{(y+3)^2}{4} = 1$

ellipse
center (0, -3)

4. $(x-3)^2 + y^2 = 25$

circle
center: (3, 0)

Chapter 10 Probability

A card is drawn from a standard 52 card deck. Find the probability of each event for one draw.

1. A heart $\frac{13}{52}$ 2. The 3 of clubs $\frac{1}{52}$

3. A king or a club $\frac{16}{52}$
 $4 + 13 - 1 \text{ king of clubs}$

4. A baseball team needs 5 more players. Twelve players try out for the team. In how many ways can 5 players be selected?

$$12C5 =$$

5. A car dealer receives 8 new cars. How many ways can the 8 cars be arranged if there are only 5 spots in the showroom?

$$8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 =$$

6. A sofa comes in 5 colors, 3 sizes, and 4 different fabrics. How many different ways can the sofa be ordered?

$$5 \cdot 3 \cdot 4 = \text{60 ways}$$

7. The school needs 5 subs next Friday. If there are 9 subs available, in how many different ways can the principal assign the subs to the 5 different rooms?

$${}_9P_5 = \text{15120 ways}$$

8. How many ways can 5 people be seated around a circular table?

$$(5-1)! = 4! = \text{24 ways}$$

Chapter 12 Statistics

1. Given the following set of data find the mean, median, and mode.

2, 3, 5, 5, 7, 10, 13, 19
6

mean: 8
median: 6
mode: 5

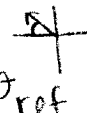
2. Given the following information: $Q_1 = 7$, $Q_2 = 12$, $Q_3 = 20$, min. = 5, and max = 28,

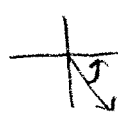
Give the range 23, find IQR 13
 $28 - 5$ $Q_3 - Q_1 = 20 - 7$

Chapter 13 Trig Functions

Find the reference angle.

1. 42° 42°

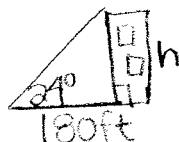
2. 155° 25° 
 $180 - 155 = \theta_{\text{ref}}$

3. 290° 70° 
 $360 - 290 = \theta_{\text{ref}}$

Find each trigonometric function value. Give exact answers! UNIT CIRCLE

4. $\sin 45^\circ$ $\frac{\sqrt{2}}{2}$ 5. $\cos 30^\circ$ $\frac{\sqrt{3}}{2}$ 6. $\cos 210^\circ$ $-\frac{\sqrt{3}}{2}$ 7. $\sin -240^\circ$ $\frac{\sqrt{3}}{2}$
 $\sin(120^\circ)$

8. You are 180 feet from the base of a building. The angle of elevation to the top of the building is 24° . Find the height of the building.



$$\tan(24) = \frac{h}{180}$$

$$\tan(24) \cdot 180 = h$$

$$h = \text{80.1 ft}$$

9. A 6 foot person casts a shadow of 11 feet. What is the angle of elevation of the sun?



$$\tan \theta = \frac{6}{11}$$

$$\theta = \tan^{-1}(6/11) = \text{29}^\circ$$

Convert each degree measure to radian measure, exact answers.

10. 18° $\frac{\pi}{10}$ 11. 45° $\frac{\pi}{4}$ UNIT CIRCLE

Convert each radian measure to degree measure. Round to the nearest tenth. UNIT CIRCLE!

12. $\frac{\pi}{6}$ 30° 13. $\frac{2\pi}{3}$ 120°

Identify the amplitude, period, horizontal shift, and vertical shift. If none, say so.

14. $y = \sin 2(\theta + 23^\circ) + 5$ 15. $y = 7 \cos (2\theta) - 4$

Chapter 14 Trigonometry

Find the area of triangle ABC to the nearest tenth.

\times $a = 4$ cm, $b = 11$ cm, $\angle C = 50^\circ$

Find the indicated side or angle to the nearest tenth.

\times $\angle A = 18^\circ$, $\angle B = 28^\circ$, $b = 100$, $c =$ \times $\angle C = 95^\circ$, $a = 5$, $c = 6$, $\angle A =$

\times $a = 17$, $b = 8$, $c = 16$, $\angle A =$ \times $\angle B = 45^\circ$, $a = 10$, $c = 5$, $b =$

Write each expression in terms of a single trigonometric function. Show all work!!

6. $\sin \theta (\csc \theta - \sin \theta)$

7. $\cot \theta \sin \theta$